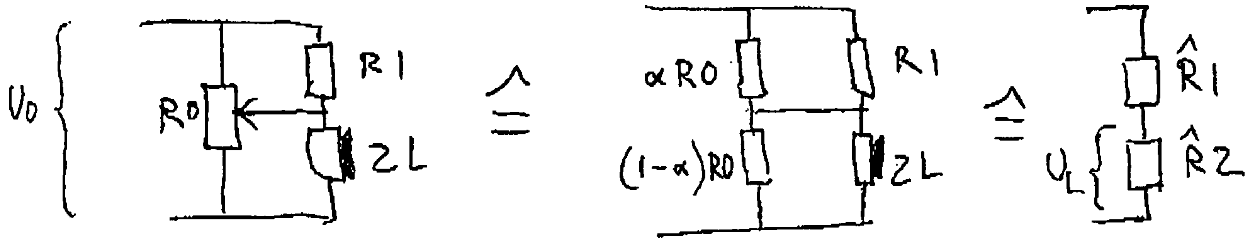
Appendix A I



SCHOLZ

α represents a value from 0 ÷ 1
(attenuation according to position of switch)

$$\hat{R}1 = \frac{\alpha R0 \cdot R1}{\alpha R0 + R1}, \quad \hat{R}2 = \frac{(1-\alpha) R0 \cdot ZL}{(1-\alpha) R0 + ZL}$$

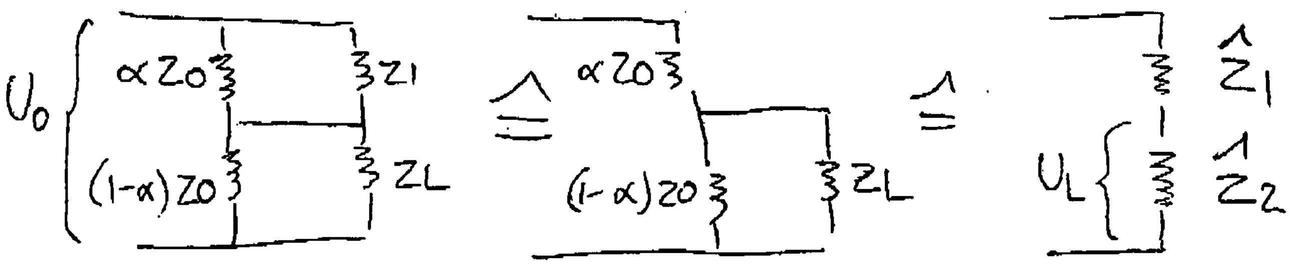
$$U_L = \frac{\hat{R}_2}{\hat{R}_1 + \hat{R}_2} U_0 = \frac{1}{1 + \frac{\hat{R}_1}{\hat{R}2}} U_0 = \frac{1}{1 + \left(\frac{\alpha}{1-\alpha}\right) \frac{R_1}{Z_L} \cdot \frac{(1-\alpha) R0 + Z_L}{\alpha R0 + R1}}$$

If assumed that $Z_L < R0$ (SCHOLZ requires $R1 + ZL \leq R0$)

$$U_L = \frac{1}{1 + \left(\frac{\alpha}{1-\alpha}\right) \frac{R1}{ZL} \cdot \frac{(1-\alpha) R0}{\alpha R0 + R1}} U_0 \approx \frac{1}{1 + \alpha \frac{R0}{ZL}} U_0$$

Because ZL is frequency-dependent ($R_2 - i\omega L$) the voltage U_L is not in constant relation to U_0

Appendix A II



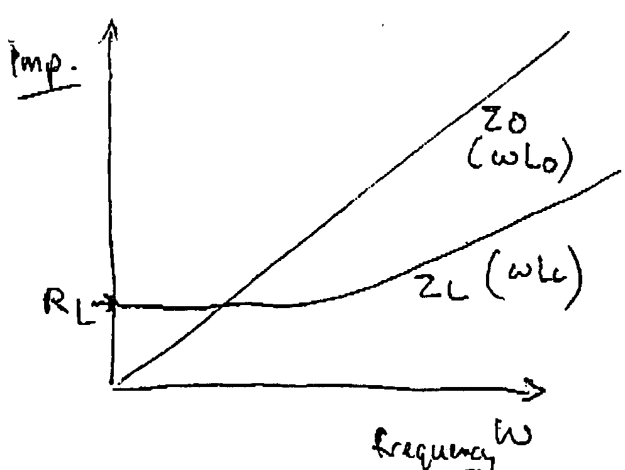
$$U_L = \frac{1}{1+\frac{\hat{Z}_1}{\hat{Z}_2}} = \frac{1}{1+\left(\frac{\alpha}{1-\alpha}\right)\cdot\frac{(1-\alpha)Z_0+Z_L}{Z_L}}\, U_0$$

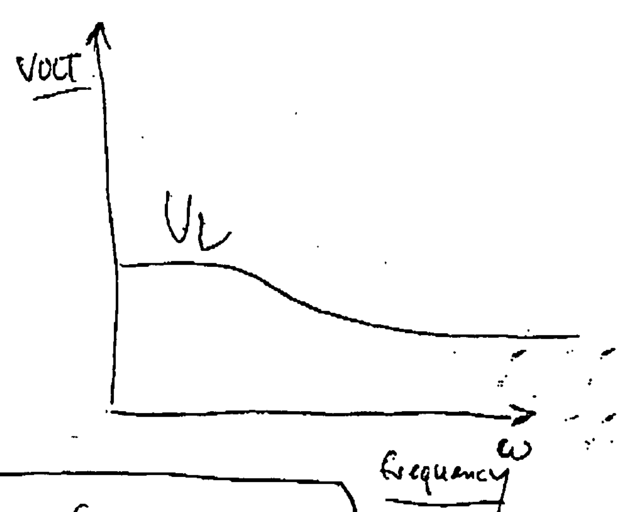
$\boxed{\text{For low frequencies}}$
$(Z_0 \ll Z_L)$

$$U_L \approx \frac{1}{1+\left(\frac{\alpha}{1-\alpha}\right)} U_0$$

$\boxed{\text{For high frequencies}}$
$(Z_L \ll Z_0 \approx -i\omega L_0)$

$$U_L \approx \frac{1}{1+\left(\frac{\alpha}{1-\alpha}\right)\cdot\frac{(1-\alpha)L_0}{L_L}}$$

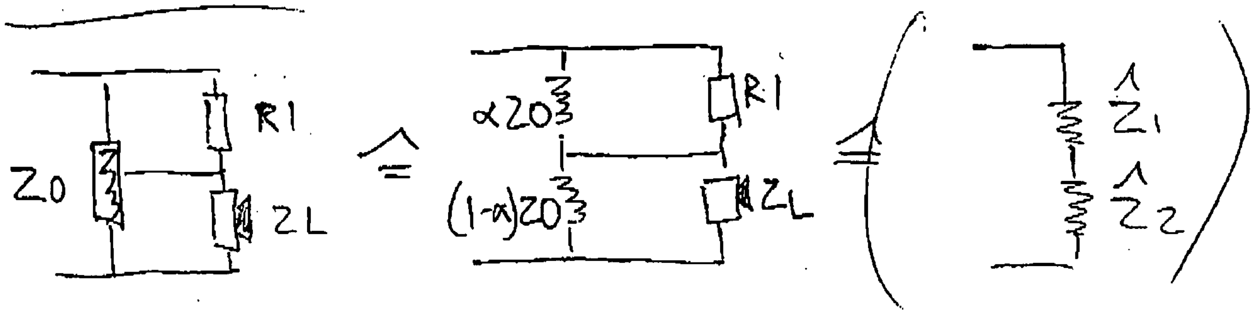




$\boxed{\text{Frequency-dependent in first order}}$

Appendix A

III



see I

$$U_L = \frac{1}{1 + \left(\frac{\alpha}{1-\alpha}\right) \frac{R_1}{Z_L} \cdot \frac{(1-\alpha) Z_0 + Z_L}{\alpha Z_0 + R_1}} U_0$$

Z_0 is in approximate proportion to Z_L $\Rightarrow$ $Z_0 = \beta Z_L$

R1 is Larger than Z_0 $\Rightarrow$ $\alpha Z_0 + R_1 \approx R_1$

$$U_L \approx \frac{1}{1 + \left(\frac{\alpha}{1-\alpha}\right) \cdot \left[1 + \beta (1-\alpha)\right]} U_0$$

no frequency-dependence in first order!